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Better Resolution

by Mary Chachas

Sharper Ultrasounds, MRI Enable OB Diagnostic Center to Offer Mothers, Babies and Families Team Support

There's hardly anyone around today who is not familiar with the ultrasound image of a baby in the uterus. Usually it's confirmation that the fetus is all right, and the birth can be anticipated with joy.

The skilled eye of a diagnostics expert, however, may detect something troubling. "A small baby may be perfectly normal, but in some cases small fetal size may be a sign of significant problems in the pregnancy," said Anne M. Kennedy, M.D., chief of women's imaging and chief of ultrasound at the University of Utah School of Medicine.

When problems are detected, the OB Diagnostic Center at University Hospital launches a huge team effort to help the baby, the mother and the family.

This tertiary referral center, which sees patients with complex obstetric/gynecologic problems, helps families come to terms with abnormalities in pregnancy and monitors pregnancies considered high-risk because of prior miscarriages, maternal hypertension or other medical conditions.

A multidisciplinary effort, the center is run jointly by the U of U medical school's Department of Radiology and the Division of Maternal-Fetal Medicine in the Department of Obstetrics and Gynecology. Center co-directors are Kennedy, associate professor of radiology, and Robert H. Ball, M.D., assistant professor of obstetrics and gynecology, and adjunct assistant professor of radiology.

Janice L. B. Byrne, M.D., associate professor of obstetrics and gynecology, and a clinical geneticist, staffs the center, handles genetic issues and works with two genetic counselors there. Deborah Granke, M.D., assistant professor of radiology, and Kathleen O'Neil, M.D., adjunct assistant professor of radiology and adjunct assistant professor of physical therapy in the U College of Health, have a special interest in prenatal diagnosis and complete the center's daily team of physicians.

The staff also includes sonographers, all of whom are certified in performance of high-risk obstetric, neonatal head, gynecological and abdominal ultrasound.

Many community physicians do ultrasound imaging, a diagnostic procedure using sound waves, primarily to confirm the gestational age of the fetus and to ensure normality, Kennedy said. "When community physicians believe

something may be wrong, or they see something unusual, they refer patients to us. Our job is to determine whether something is wrong, and, if so, to characterize the problem," she said. If a major problem is detected, the mother is considered high-risk and the baby is delivered at University Hospital. The mother's regular obstetrician is contacted and a plan is devised for the family. The regular obstetrician gets reports of follow-up scans as well as results of perinatology assessment and any diagnostic tests performed.

"Sometimes we must be the bearers of bad news, but we do have opportunities to say good things too, alleviating worries about serious trouble," said Ball.

Among the things diagnostic center physicians evaluate are a fetus that is not growing well, an average-sized mother with a very big baby, multiple pregnancy and mothers with hypertension or bad obstetric history.

If an ultrasound is normal, the mother-to-be goes on her way. If an abnormality is detected, the ultrasound is repeated by the attending physician, along with the sonographer. Depending on the results, a number of follow-up options are available. These include genetic counseling, amniocentesis, perinatology consultation and non-stress testing, a non-invasive test that measures the intactness of the fetus' central nervous system by analysis of the fetal heart rate in response to fetal movement.

A biophysical profile is another diagnostic test that may be done to assess fetal well-being. An ultrasound is done to evaluate fetal activity, breathing motion and the amount of amniotic fluid.

The center sees about 60 patients daily. Approximately 38 percent of OB Diagnostic Center ultrasounds show

an abnormality, compared with about 5 percent abnormal findings in the community, according to Kennedy.

The newest diagnostic tool at the center is a fetal MRI. "Whereas ultrasound has been the standard for many years, MRI on babies in utero is a relatively new development in fetal imaging. It is especially useful for evaluating the brain. In instances where the mother is large, it may be difficult to see all fetal structures sonographically, and MRI can confirm abnormalities suspected on ultrasound," said Kennedy, who directs the program.

Ultrasound is so common that most mothers have at least one during a pregnancy. The most important time to have an ultrasound is late in mid-trimester, at about 18-20 weeks, Byrne said. "That is early enough to confirm the gestational age, which is extremely important in obstetrics, and also far enough along that many structural anomalies can be detected. Some anomalies that may be confusing on ultrasound can be distinguished by MRI."

Research performed at the center, by Kennedy in fetal MRI and by Ball and Byrne in their specialties, has been presented at professional meetings.

A benefit of the center is that patients are in a system that draws on resources

from many specialists. In the case of spina bifida, a neural tube defect and among the most common problems detected with ultrasound, parents will meet with neurosurgeons and with nurses who will care for the baby. If a heart problem is discovered, a pediatric cardiologist from Primary Children's Medical Center is contacted and further evaluates the fetal heart by echocardiography. The parents are counseled about available treatment options. In the case of abnormal kidneys and bladder, urology specialists are available.

If surgery is needed, the U works closely with fetal surgery centers, primarily the Fetal Treatment Center at the University of California, San Francisco, Children's Hospital of Philadelphia and Vanderbilt University, Nashville. There is now potential for repair in utero for spina bidifa; lung lesions, which could lead to heart failure, also are treated.

One of the center's four ultrasound rooms also is used for special procedures, such as umbilical cord sampling for blood to measure pH or perform chromosome analysis. In utero transfusions may be life saving for babies with severe anemia; shunts may be placed in fetal cavities to drain excess fluids. These procedures are performed by members of the maternal-fetal medicine division.

Women who may have genetic issues constitute a special group of patients who find help at the diagnostic center.

For the most common genetic problems, physicians consider the mother's age-35 years or older-and women with abnormal maternal serum screening. This blood test is done at 15-17 weeks of pregnancy in most women, primarily to detect spina bifida, Down syndrome or other chromosomal abnormalities.

Some patients seek a genetic consultation because their families have inherited conditions they are concerned about, and they have an ultrasound as part of this evaluation. Others come for pre-conception consultation with Byrne or the genetic counselors.

Byrne, a specialist in reproductive genetics, also cares for women who themselves have such genetic conditions as cystic fibrosis, Marfan syndrome or phenylketonuria (PKU), which will impact the pregnancy. Mothers carrying babies with genetic conditions or multiple anomalies also are counseled. In addition to making the diagnosis and determining how the pregnancy will be affected, the team evaluates the risk of recurrence and the possibility of detection in a future pregnancy.

Bimonthly prenatal diagnostic conferences led by either Ball or Byrne expand the center's scope. The meeting includes ob/gyn specialists, perinatologists, neonatologists, pathologists, sonographers, counselors, cytogenetic specialists (who do chromosome analysis) and representatives from the Utah Birth Defects Network. These experts review all abnormal ultrasounds and concentrate on strategies for taking care of the mother and the baby.

Ball is not shy about characterizing the center as "pre-eminent" for fetal diagnosis in the Intermountain West. "We may not yet have the name

recognition of similar centers at the University of California at San Francisco or Washington University in St. Louis, but the quality of work here is just as outstanding," he said.

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